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Nonlinear interaction between long and short waves in a generalized elastic solid

In this study, the nonlinear interaction between the long acoustical waves and the short optical waves propagating in a dispersive elastic medium, i. e. micropolar elastic medium, is considered. In particular, the case where the phase velocity of the long waves and the group velocity of the short waves are equal to each other is studied. By using the reductive perturbation method, the coupled nonlinear partial differential equations describing this interaction are derived.